

WHAT IS CLAIMED IS:

1. A radiation image pick-up device for performing image pick-up by using radiation, comprising:

- 5 a plurality of input pixels, each having a wavelength converter for converting incident radiation into light, conversion means for converting the incident radiation and the light converted by the wavelength converter into charge, storage means for
10 storing the converted charge, and read means for reading a signal corresponding to the charge stored in the charge storage means; and
 a plurality of output lines for outputting charges read from the input pixels, which are connected with
15 the plurality of input pixels.

2. A radiation image pick-up device according to claim 1, further comprising first reset means for resetting the charge in the charge storage means.

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3. A radiation image pick-up device according to claim 2, wherein the plurality of input pixels, the output lines, and the first reset means are respectively formed on an insulating substrate, the
25 first reset means includes a reset thin film transistor, and each of the input pixels includes a read thin film transistor.

4. A radiation image pick-up device according to claim 3, wherein the reset thin film transistor and the read thin film transistor are made of non-single crystalline semiconductor.

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5. A radiation image pick-up device according to claim 1, further comprising a transparent electrode which is located between the wavelength conversion means and the charge conversion means and transmits the light converted by the wavelength conversion means.

6. A radiation image pick-up device according to claim 1, wherein the charge conversion means has a semiconductor substrate for converting radiation into charge and a plurality of divided electrodes provided in correspondence with the plurality of input pixels formed on an insulating substrate, the semiconductor substrate and the insulating substrate are laminated, and the plurality of divided electrodes and storage capacitors of the plurality of pixels are electrically connected with each other.

7. A radiation image pick-up device according to claim 6, wherein the semiconductor substrate is divided into plural regions.

8. A radiation image pick-up device according to

claim 1, further comprising amplifiers for signal amplification in the output lines.

5 9. A radiation image pick-up device according to claim 1, wherein the charge conversion means is formed in a semiconductor substrate and has a pn junction portion.

10 10. A radiation image pick-up device according to claim 1, wherein the charge conversion means has an energy band gap with a band gap of at least 1 eV or larger.

15 11. A radiation image pick-up device according to claim 2, further comprising a second reset means for resetting the output lines, which is connected with the output lines.

20 12. A radiation image pick-up device according to claim 1, wherein the read means is composed of a thin film transistor, and the thin film transistor is made of non-single crystalline semiconductor.

25 13. A radiation image pick-up device according to claim 1, wherein the charge storage means and the read means are formed on the insulating substrate in the same layer structure having a lower electrode, a

dielectric film, a high resistance semiconductor layer, a low resistance semiconductor layer, and an upper electrode.

5 14. A radiation image pick-up device according to claim 1, wherein the charge conversion means is made of semi-insulating semiconductor.

10 15. A radiation image pick-up device according to claim 1, wherein the wavelength conversion means includes a phosphor.

15 16. A radiation image pick-up device according to claim 15, further comprising a reflective layer on a radiation incident side of the wavelength conversion means.

20 17. A radiation image pick-up device according to claim 1, wherein a thickness of a high concentration impurity region composing the charge conversion means is set to be 1/5 of an absorption ratio or less.